

DISK DRIVE EMPLOYING ADAPTIVE FLUSHING OF A WRITE CACHE

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ABSTRACT OF THE DISCLOSURE

A method embodied as software or firmware code permits the adaptation of disk drives employing write-back caching to reduce the possibility of lost data from the write cache. In one embodiment, the method is integrated with the host operating system software employed by a host computer coupled to the disk drive. The method issues write requests to the disk drive as it receives them from the applications running on the host computer. The disk drive processes the issued requests as it is designed to, using write-back caching techniques. After each request is cached, the disk drive controller acknowledges the write request back to the host. The host delays communicating the acknowledgements back to their originating applications until the data has been actually written to the disk media. Because write-back caching does not commit cached requests to disk on a regular basis, the host software simply forces the disk drive to execute cached write requests on a regular basis using a CACHE_FLUSH command. The disk drive employs standard throughput optimization techniques to reduce the overall latency of the disk accesses. When the rate of the request stream is low, the host simply issues a flush command after issuing each write request to the drive. As the rate of the request stream increases, the host lets the requests pool in the cache rather than at the host. It then issues a flush command when the pool size reaches a number where the incremental reduction in throughput to the disk media during the flush no longer offsets the incremental increase in request latency due to the pooling time. When the flush is complete, the disk drive notifies the host, and the host releases the acknowledgements of all of the pooled requests to their originating applications.